

Proven Safety Countermeasures

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Introduction and Background

“While States should still be considering the application of all of the countermeasures listed in the 2008 guidance, this memo supersedes the previous guidance.” – 2012 Countermeasure Guidance

- FHWA Issued Nine Proven Countermeasures Guidance in 2008.
- Many of those countermeasures have been widely applied.
- FHWA is updating our previous guidance.
- We are taking into consideration the latest safety research.

“...we encourage safety practitioners to consider a new set of countermeasures ...that are research-proven, but not widely applied on a national basis.” – 2012 Countermeasure Guidance

Process for Selecting Countermeasures

- **Assembled a Team of FHWA Experts from Across the Safety Discipline**
 - Multiple Perspectives (HQ, Divisions, Resource Center)
 - Diverse Focus Areas (Pedestrian, Roadway Departure, Intersections, Data)
 - Countermeasure Experience (Promoting, Technical Assistance, Analysis, Evaluation)
- **Determined the Current Level of Application of 2008 Countermeasure List**
 - Three Carried Over (Roundabouts, Medians / Pedestrian Refuge, and Safety Edge)
 - Rumbles also Carried Over – With a Focus on Two-Lane Roads
- **Expert Group Determined New Countermeasures**
 - Consulted CMF Clearinghouse Data (Star Ratings, CMFs)
 - Narrowed List based on Field Experience and Expertise
 - Developed Business Cases for All Countermeasures
- **Vetted List and Guidance**
 - DA Safety Council
 - HSA / Resource Center Leadership
 - Office of Operations
 - Office of Infrastructure

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Countermeasure Selection Process

2008 Countermeasures

1. Rumble Strips and Rumble Stripes*
2. Median Barriers
3. Walkways
4. Left and Right Turn Lanes at Stop-Controlled Intersections
5. Yellow Change Intervals
6. Roadway Safety Audit 1.27**
7. Roundabouts 1.23
8. Medians and Pedestrian Refuge Areas 1.17
9. Safety Edge 1.15



2012 Countermeasures

1. Roundabouts
2. Safety Edge
3. Medians and Pedestrian Crossing Islands in Urban and Suburban Areas
4. Longitudinal Rumble Strips and Stripes on 2-lane Roads*
5. Corridor Access Management
6. Backplates and Retroreflective Borders
7. Enhanced Delineation and Friction for Horizontal Curves
8. Pedestrian Hybrid Beacon
9. "Road Diets" (Roadway Reconfiguration)

* Group decided to retain for two-lane roads only, based on application of countermeasure
 ** Not a Countermeasure

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Data-Driven Safety Process

“...countermeasure selection should continue to be based on appropriate analytical techniques...”

- 2012 Countermeasure Guidance

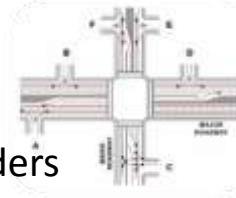
Encourage States to Use Analytical Site-Specific Approaches (such as the Highway Safety Manual) and Systemic Planning Approaches to Make Safety Investment Decisions

- Conduct Appropriate Analysis of Quality Safety Data
- Use Evidence-Based Framework for Decision-Making
- Use the CMF Clearinghouse to Choose Appropriate Countermeasures
- Consider the Nine Countermeasures as Viable Options

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Addressing the **Intersection** Focus Area:

- Roundabouts
- Corridor Access Management
- Backplates with Retroreflective Borders
- “Road Diet” (Roadway Reconfiguration)
- Pedestrian Hybrid Beacon



“There are approximately 300,000 signalized intersections in the United States. About 1/3 of all intersection fatalities occur at these locations; resulting in roughly 2,300 people killed in a single year. ”

— Roundabouts Fact Sheet



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Addressing the **Roadway**

Departure Focus Area

- Longitudinal Rumble Strips and Stripes on 2-Lane Roads
- Enhanced Delineation and Friction for Horizontal Curves
- Safety Edge_{SM}



Roadway Departure Risk Management

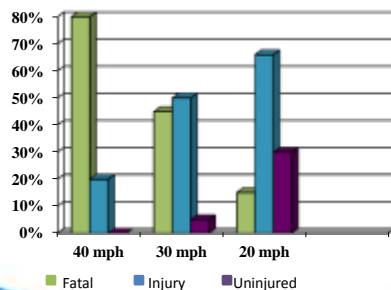
1. Keep Vehicles on Roadway
2. Reduce Likelihood of Crashes
3. Minimize Severity

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Addressing the **Pedestrian**

Safety Focus Area

- Medians and Pedestrian Crossing Islands in Urban and Suburban Areas
- Pedestrian Hybrid Beacon
- “Road Diet” (Roadway Reconfiguration)



Pedestrian Safety Facts:

- Pedestrians represent over 12% of Highway Fatalities.
- Midblock locations account for over 70% of pedestrian fatalities.
- Over 80% of pedestrian fatalities hit by vehicles traveling at 40 mph or faster will die, while less than 20% die when hit at 20 mph or less.

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Roundabouts

- Modern designs are safer and more efficient than old circles and rotaries
- Can reduce crashes resulting in injury or fatality by nearly 80%¹
- Should be considered as part of corridor or intersection improvement projects
- Highly adaptable, proven in both low-speed urban and high-speed rural environments



1. AASHTO Highway Safety Manual, Chapter 14

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Roundabouts



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Roundabouts



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Longitudinal Rumble Strips and Stripes on 2-Lane Roads

- Alerts drivers with sound and vibration when vehicles cross the edge or center line.
- Reduction of Severe Crashes:
 - Rural Edge, Run Off Road: 36%
 - Rural Center, Head-ons: 44%
 - Urban Center, Head-ons: 64%



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Safety Edge_{SM}

- Consolidating the pavement edge into 30° shape during paving to provide stability for vehicles recovering from a roadway departure
- 6% reduction of total crashes
- B/C range: 4 to 63
- Implement as a standard practice for paving and resurfacing projects



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Safety Edge_{SM}



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Safety Edge_{SM}



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Medians and Pedestrian Crossing Islands in Urban and Suburban Areas

- *Median* is between opposing lanes of traffic, excluding turn lanes (can be paint or concrete).
- Islands can be placed at intersections or midblock locations to separate crossing pedestrians from motor vehicles.
- Use in curbed sections of multi-lane roadways in urban areas with vehicular-pedestrian conflicts and med/high travel speeds.



Safety results:
46% reduction in pedestrian crashes
39% reduction in total crashes

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Corridor Access Management

- Involves the design, implementation and control of entry and exit points along a roadway
- Reducing access points along urban/suburban corridor can reduce injury and fatal crashes by about 25%¹
- May be considered as a component of general corridor improvements or as its own project



1. AASHTO Highway Safety Manual, Chapter 14

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Backplates with Retroreflective Borders

- Retroreflective strip added around the border of a signal backplate
- Documented 15% reduction in crashes of all types and severities at urban signalized intersections¹
- Consider as standard treatment for new and modernized signal projects, or as a systemic retrofit safety improvement



1. CMF Clearinghouse

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Enhanced Delineation and Friction for Horizontal Curves

- Low-cost treatments
- Includes signs and markings that help drivers safely negotiate curves or...
- Additional pavement friction to address geometric deficiencies



Safety Impacts:

- Vary based on application
- Up to 43% reduction of all fatal crashes

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Pedestrian Hybrid Beacon

- Pedestrian-activated beacon located on the roadside or on mast arms over major approaches to an intersection.
- Follow guidance in MUTCD Chapter 4F.



Safety results:

- 69% reduction in pedestrian crashes
- 29% reduction in total crashes

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“Road Diet” (Roadway Reconfiguration)

- Conversion of four-lane undivided roadway into three lanes with two through-lanes and a center two way left turn.
- Best on Roadways with ADT of 20,000 or less.

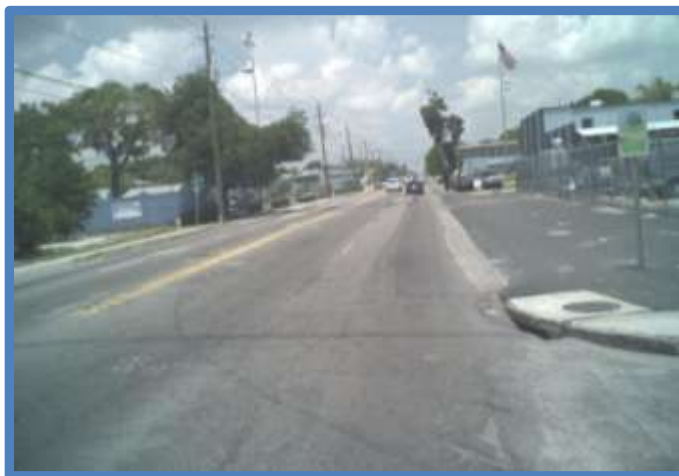
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29% reduction in all roadway crashes



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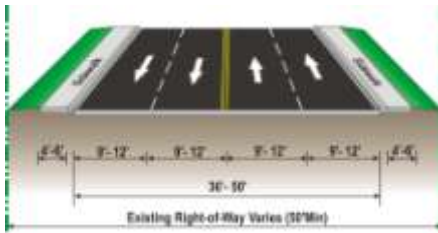
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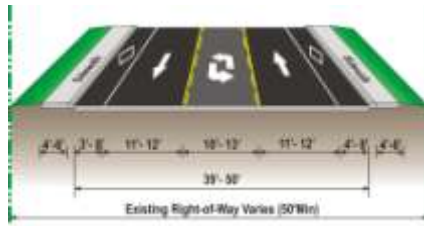
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“Road Diet” (Roadway Reconfiguration)

Before Conditions



After Conditions



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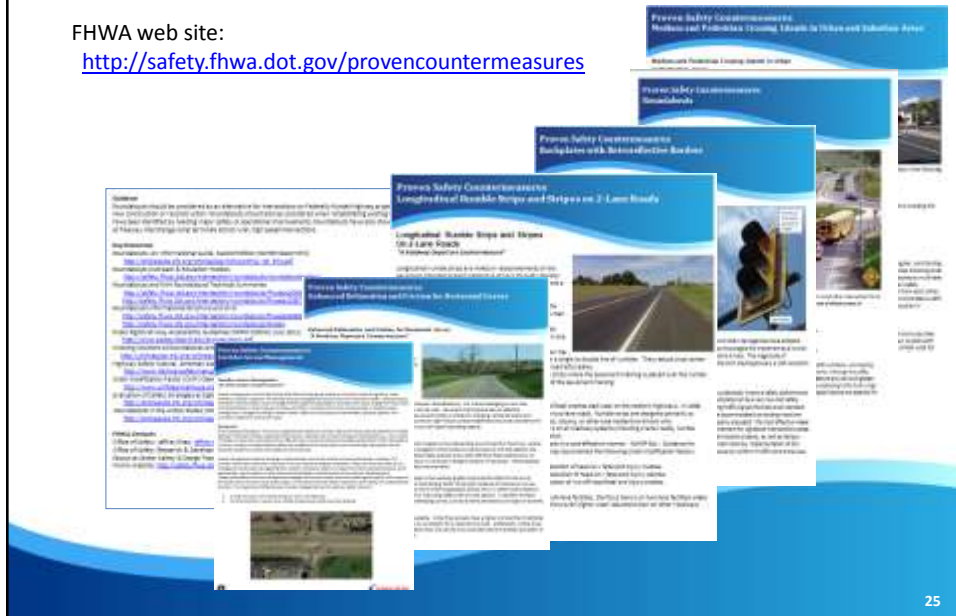
“Road Diet” (Roadway Reconfiguration)



Fact Sheets and Further Information

FHWA web site:

<http://safety.fhwa.dot.gov/provencountermeasures>



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Contacts for Further Information

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Questions and Answers

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